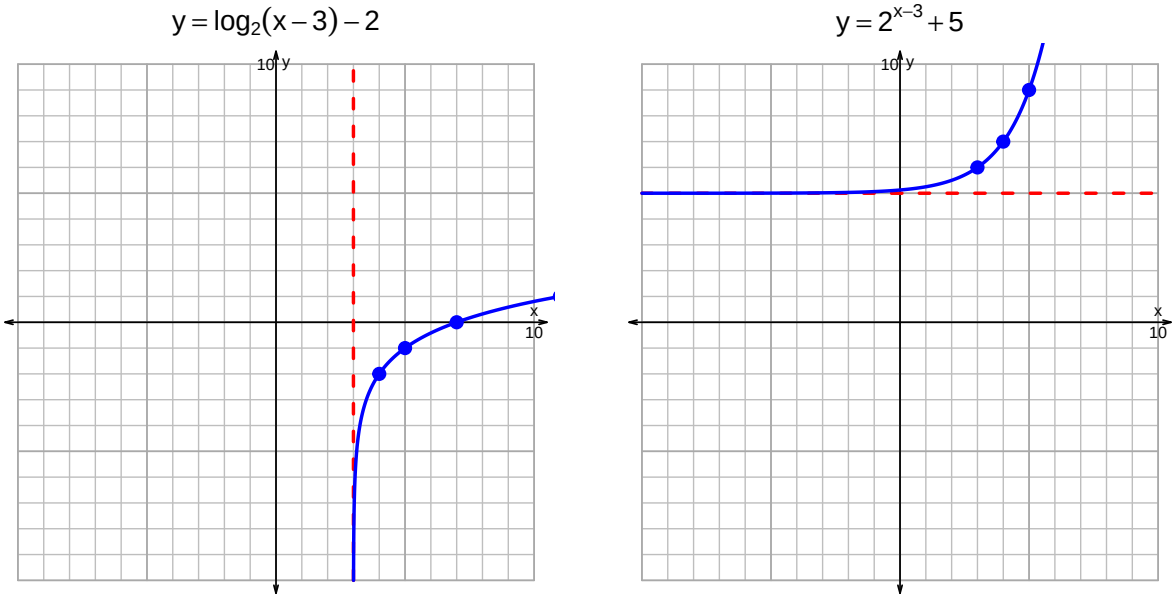
Name: Date:

s18: EXP LOG (SLTN v370)

1. (10 pts) Graph $y = \log_2(x-3) - 2$ and $y = 2^{x-3} + 5$ on the grids below. Also, draw any asymptotes with dashed lines.



Somewhat useful hint: $2^3 = 8$, *and thus* $\log_2(8) = 3$.

2. (10 pts) Write (but do not evaluate) the solution to the equation below by writing a logarithmic expression. Please do not do any arithmetic; just move numbers around.

$$-23 = \left(\frac{-5}{7}\right) \cdot 2^{-4t/3}$$

Divide both sides by $\frac{-5}{7}$.

$$\frac{23 \cdot 7}{5} = 2^{-4t/3}$$

Take log, base 2, of both sides.

$$\log_2\left(\frac{23 \cdot 7}{5}\right) = \frac{-4t}{3}$$

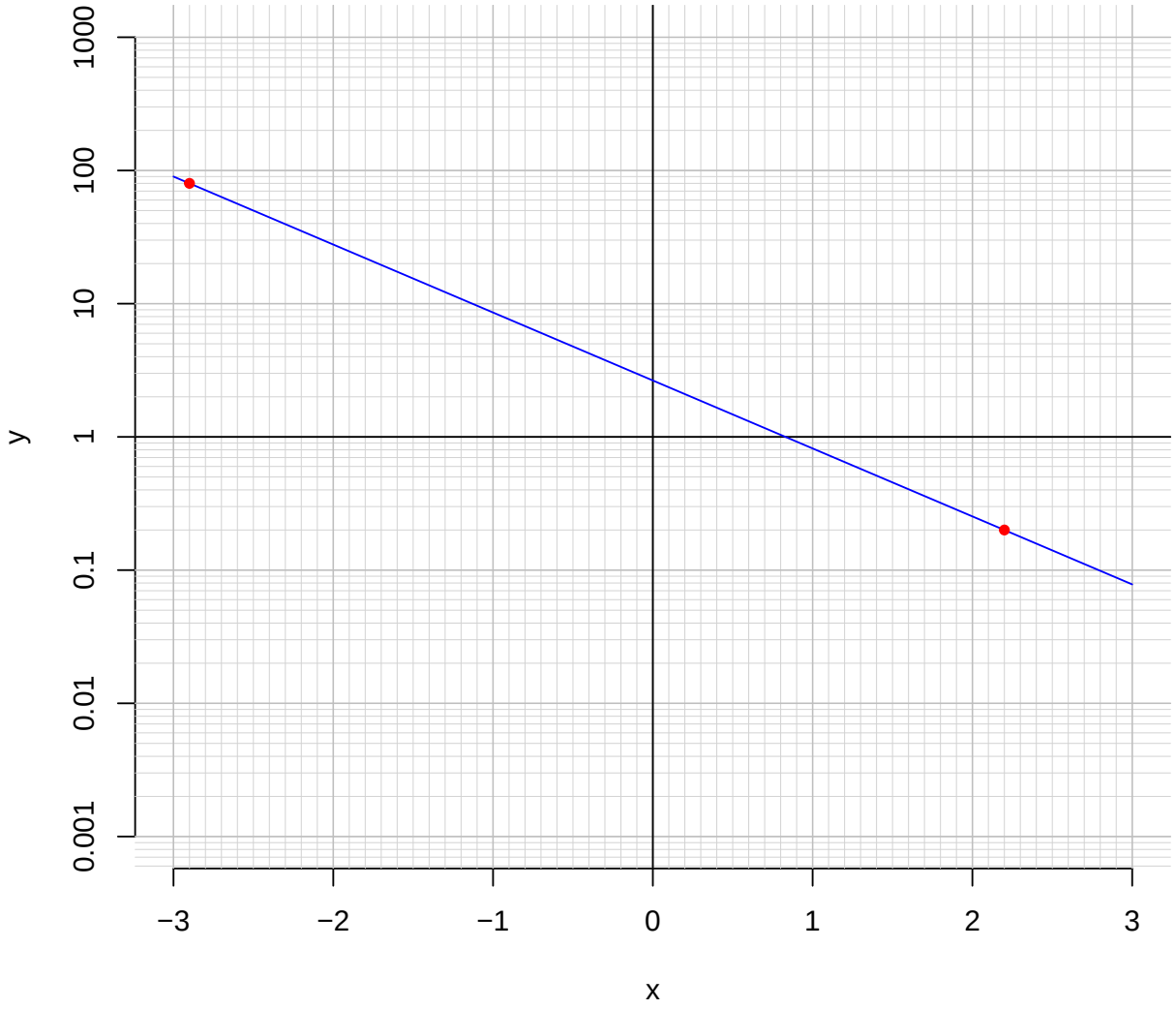
Divide both sides by $\frac{-4}{3}$.

$$\frac{-3}{4} \cdot \log_2\left(\frac{23 \cdot 7}{5}\right) = t$$

Switch sides.

$$t = \frac{-3}{4} \cdot \log_2\left(\frac{23 \cdot 7}{5}\right)$$

3. (10 pts) An exponential function $f(x) = 2.65 \cdot e^{-1.17x}$ is graphed below on a semi-log plot.



a. Using the plot above, evaluate $f(2.2)$.

$$f(2.2) = 0.2$$

b. The inverse function is logarithmic.

$$f^{-1}(x) = \frac{-1}{1.17} \cdot \ln\left(\frac{x}{2.65}\right)$$

Using the plot above, evaluate $f^{-1}(80)$.

$$f^{-1}(80) = -2.9$$